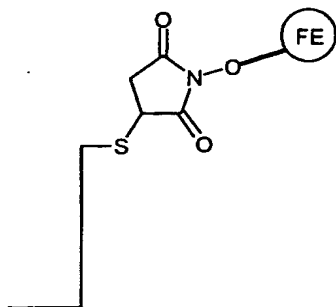


Claims

1. A building block of the general formula

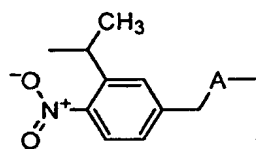


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capable of transferring a functional entity (FE) to a recipient reactive group, wherein the lower horizontal line is a **Complementing Element** identifying the functional entity and the vertical line between the complementing element and the S atom is a **Spacer**.

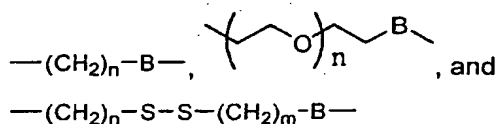
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2. The building block of claim 1, wherein the spacer is a valence bond, C₁-C₆ alkenylene-A-, C₁-C₆ alkenylene-A-, C₂-C₆ alkynylene-A-, or



said spacer optionally being connected through A to a moiety selected from

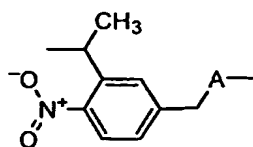
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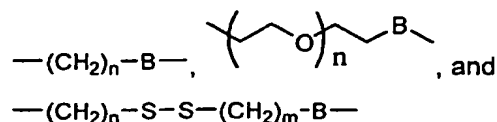
where A is a valence bond, -C(O)NR¹-, -NR¹-, -O-, -S-, or -C(O)-O-; B is a valence bond, -O-, -S-, -NR¹- or -C(O)NR¹- and connects to the S atom of the carrier; R¹ is selected independently from H, C₁-C₆ alkyl, C₃-C₇ cycloalkyl, C₁-C₆ alkenylene-aryl, or aryl substituted with 0-5 halogen atoms selected from -F, -Cl, -Br and -I; and n and m independently are integers ranging from 1 to 10.

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3. The compound according to claim 1, wherein the **Spacer** is C₁-C₆ alkenylene-A-, C₁-C₆ alkenylene-A-, C₂-C₆ alkynylene-A-, or

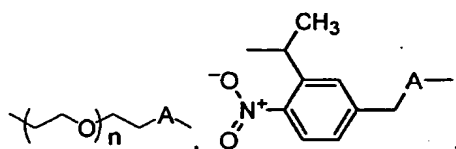


said spacer optionally being connected through A to a moiety selected from

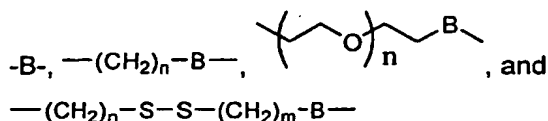


- 5 where A is $\text{---C(O)NR}^1\text{---}$, or ---S--- ; B is ---S--- , $\text{---NR}^1\text{---}$ or $\text{---C(O)NR}^1\text{---}$ and connects to S-C-connecting group; R^1 is selected independently from H, $\text{C}_1\text{---C}_6$ alkyl, $\text{C}_1\text{---C}_6$ alkylene-aryl, or aryl; and n and m independently are integers ranging from 1 to 6.

4. The compound according to claim 1, wherein **Spacer** is ---A--- , a group $\text{C}_1\text{---C}_6$ alkylene-A-, $\text{C}_2\text{---C}_6$ alkenylene-A-, or $\text{C}_2\text{---C}_6$ alkynylene-A- optionally substituted with 1 to 3 hydroxy groups, or



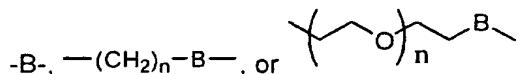
said spacer being connected through A to a linker selected from



- 15 where A is a valence bond, $\text{---NR}^2\text{---}$, $\text{---C(O)NR}^2\text{---}$, $\text{---NR}^2\text{---C(O)---}$, ---O--- , ---S--- , ---C(O)---O--- or $\text{---OP(=O)(O)---O---}$; B is a valence bond, ---O--- , ---S--- , $\text{---NR}^2\text{---}$, ---C(O)--- or $\text{---C(O)NR}^2\text{---}$ and connects to S-C-connecting group; R^2 is selected independently from H, $\text{C}_1\text{---C}_6$ alkyl, $\text{C}_3\text{---C}_7$ cycloalkyl, aryl, $\text{C}_1\text{---C}_6$ alkylene-aryl, $\left(\text{---}(\text{CH}_2)_n\text{---O---} \right)_n \text{---G---}$ or $\left(\text{---}(\text{CH}_2)_n\text{---N}^{\text{G}}\text{---} \right)_n \text{---G---}$; G is H or $\text{C}_1\text{---C}_6$ alkyl; and n and m independently are integers ranging from 1 to 10.

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5. A compound according to claim 4, wherein the **spacer** is $\text{C}_2\text{---C}_6$ alkenylene-A, said spacer being connected through A to a moiety selected from

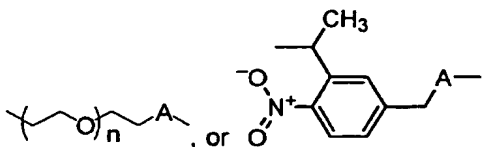


where A is a valence bond, $-\text{C}(\text{O})\text{NR}^2-$, $-\text{NR}^2-\text{C}(\text{O})-$, $-\text{S}-$, $-\text{C}(\text{O})-\text{O}-$ or $-\text{OP}(=\text{O})(\text{O})-\text{O}-$; B is a valence bond, $-\text{S}-$, $-\text{NR}^2-$, or $-\text{C}(\text{O})-$ and connects to S-C-connecting group; n and m independently are integers ranging from 1 to 10 and

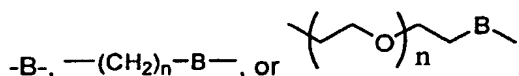
R^2 is selected independently from H, $(\text{CH}_2)_n\text{G}$ or $(\text{CH}_2)_n\text{N}^+\text{G}$, wherein G is H or

- 5 C_1-C_6 alkyl; and the spacer is connected to the complementing element through a nucleobase.

6. A compound according to claim 4, wherein the spacer is -A-,



- 10 said spacer being connected through A to a moiety selected from



where A is a valence bond, $-\text{NR}^2-\text{C}(\text{O})-$, $-\text{O}-$, or $-\text{S}-$; B is a valence bond, $-\text{S}-$, $-\text{NR}^2-$, or $-\text{C}(\text{O})-$ and connects to S-C-connecting group;

n and m independently are integers ranging from 1 to 10 and

- 15 R^2 is selected independently from H, $(\text{CH}_2)_n\text{G}$ or $(\text{CH}_2)_n\text{N}^+\text{G}$, wherein G is H or C_1-C_6 alkyl; and the spacer is connected to the complementing element via a phosphorus group.

7. A compound according to claim 6, wherein the phosphorus group is a phosphate or thiophosphate group attached to a 3' or 5' end of a complementing element.

8. The building block according to any of the claims 1 to 7, wherein FE is $\begin{array}{c} \text{V} \\ \parallel \\ \text{X} \end{array} \text{R}$ where

X = $-\text{C}-$, $-\text{S}-$, $-\text{P}-$, $-\text{S}(\text{O})-$, or $-\text{P}(\text{O})-$,

V = O, S, NH, or N- C_1-C_6 alkyl, and

- 25 R is H or selected among the group consisting of a C_1-C_6 alkyl, C_2-C_6 alkenyl, C_2-C_6 alkynyl, C_4-C_8 alkadienyl, C_3-C_7 cycloalkyl, C_3-C_7 cycloheteroalkyl, aryl, and heteroaryl, said group being substituted with 0-3 R^4 , 0-3 R^5 and 0-3 R^9 or C_1-C_3 alkylene- NR^4 , C_1-C_3 alkylene- $\text{NR}^4\text{C}(\text{O})\text{R}^8$, C_1-C_3 alkylene- $\text{NR}^4\text{C}(\text{O})\text{OR}^8$, C_1-C_2 al-

kylene-O-NR⁴₂, C₁-C₂ alkylene-O-NR⁴C(O)R⁸, C₁-C₂ alkylene-O-NR⁴C(O)OR⁸ substituted with 0-3 R⁹.

where R⁴ is H or selected independently among the group consisting of C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₇ cycloalkyl, C₃-C₇ cycloheteroalkyl, aryl, heteroaryl, said group being substituted with 0-3 R⁹ and

R⁵ is selected independently from -N₃, -CNO, -C(NOH)NH₂, -NHOH, -NHNHR⁶, -C(O)R⁶, -SnR⁶₃, -B(OR⁶)₂, -P(O)(OR⁶)₂ or the group consisting of C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₄-C₈ alkadienyl said group being substituted with 0-2 R⁷,

where R⁶ is selected independently from H, C₁-C₆ alkyl, C₃-C₇ cycloalkyl, aryl or C₁-C₆ alkylene-aryl substituted with 0-5 halogen atoms selected from -F, -Cl, -Br, and -I; and R⁷ is independently selected from -NO₂, -COOR⁶, -COR⁶, -CN, -OSiR⁶₃, -OR⁶ and -NR⁶₂.

R⁸ is H, C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₃-C₇ cycloalkyl, aryl or C₁-C₆ alkylene-aryl substituted with 0-3 substituents independently selected from -F, -Cl, -NO₂, -R³, -OR³, -SiR³₃

R⁹ is =O, -F, -Cl, -Br, -I, -CN, -NO₂, -OR⁶, -NR⁶₂, -NR⁶-C(O)R⁸, -NR⁶-C(O)OR⁸, -SR⁶, -S(O)R⁶, -S(O)₂R⁶, -COOR⁶, -C(O)NR⁶₂ and -S(O)₂NR⁶₂.

9. A compound according to claim 8, wherein R is H or selected among the group consisting of a C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₄-C₈ alkadienyl, C₃-C₇ cycloalkyl, C₃-C₇ cycloheteroalkyl, aryl, and heteroaryl, said group being substituted with 0-3 R⁵ and 0-3 R⁹, or selected among the group consisting of C₁-C₃ alkylene-NR⁴₂, C₁-C₃ alkylene-NR⁴C(O)R⁸, C₁-C₃ alkylene-NR⁴C(O)OR⁸, C₁-C₂ alkylene-O-NR⁴₂, C₁-C₂ alkylene-O-NR⁴C(O)R⁸, and C₁-C₂ alkylene-O-NR⁴C(O)OR⁸ substituted with 0-3 R⁹.

10. A compound according to claims 8 or 9, wherein R is H or selected among the group consisting of C₁-C₆ alkyl, C₂-C₆ alkenyl, C₂-C₆ alkynyl, C₄-C₈ alkadienyl, C₃-C₇ cycloalkyl, C₃-C₇ cycloheteroalkyl, aryl, and heteroaryl, said group being substituted with 0-3 R⁵ and 0-3 R⁹.

11. A compound according to any of the claims 8 to 10, wherein R is selected among the group consisting of C₁-C₃ alkylene-NR⁴₂, C₁-C₃ alkylene-NR⁴C(O)R⁸, C₁-C₃ alkylene-NR⁴C(O)OR⁸, C₁-C₂ alkylene-O-NR⁴₂, C₁-C₂ alkylene-O-NR⁴C(O)R⁸, and C₁-C₂ alkylene-O-NR⁴C(O)OR⁸ substituted with 0-3 R⁹.

12. A compound according to any of the claims 1 to 11, wherein X = C and V = O or S.

13. A compound according to claims 1 to 12, wherein X = C and V = O.

14. A compound according to claims 1 to 13, wherein complementing element is a nucleic acid.

15. A compound according to claims 1 to 14, wherein Complementing element is a sequence of nucleotides selected from the group of DNA, RNA, LNA PNA, or morpholino derivatives.

16. A library of compounds according to any of the claims 1 to 15, wherein each different member of the library comprises a complementing element having a unique sequence of nucleotides, which identifies the functional entity.

17. A method for transferring a functional entity to a recipient reactive group, comprising the steps of

providing one or more building blocks according to claims 1 to 15,

contacting the one or more building blocks with a corresponding encoding element associated with a recipient reactive group under conditions which allow for a recognition between the one or more complementing elements and the coding elements, said contacting being performed prior to, simultaneously with, or subsequent to a transfer of the functional entity to the recipient reactive group.

18. The method according to claim 17, wherein the coding element comprises one or more coding sequences comprised of 1 to 50 nucleotides and the one or more complementing elements comprises a sequence of nucleotides complementary to one or more of the coding sequences.

19. The method of claims 17 or 18, wherein the recipient reactive group is an amine group, which may be part of a chemical scaffold, and the linkage between the functional entity and the scaffold is of the general chemical structure:

Scaffold-NH-X(=V)-R

In which

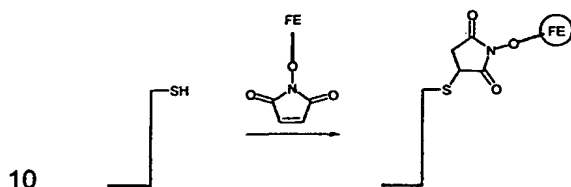
X = -C-, -S-, -P-, -S(O)-, -P(O)-, and

V = O, S, NH, N-C₁-C₆ alkyl.

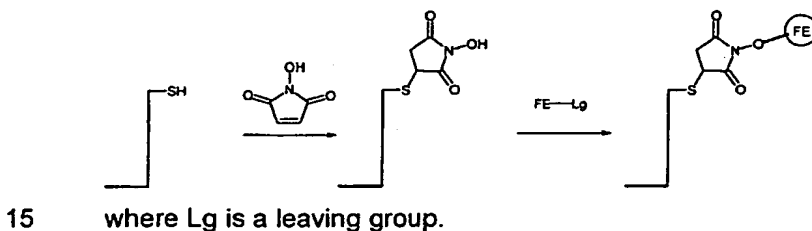
5.

20. The method according to claim 19, wherein X is C and V is O.

21. A process for preparing a building block according to claim 1, comprising the step of



22. A process for preparing a building block according to claim 1, comprising the steps of



23. A process according to claim 18, wherein the leaving group is selected from

